

Cl
end
recording sheet against said endless belt means so that said unfixed toner image is fixed on
said recording sheet with heat by said heating means as said recording sheet is transferred by
movement of said endless belt means and said pressure roller means.

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-75 are pending in the present application with Claims 1, 16, 31, 43-46 and 61 having been amended by the present amendment.

In the outstanding Office Action, Claims 43-45 were rejected under 35 U.S.C. § 112, second paragraph; Claims 1, 3, 6-8, 12, 16, 18, 21-23, 27, 31, 33, 36-38, 42, 46, 48, 51-53, 57, 61, 63, 66-68 and 72 were rejected under 35 U.S.C. § 103(a) as unpatentable over Kanari et al. in view of Kinouchi et al.; Claims 2, 17, 32, 47 and 62 were rejected under 35 U.S.C. § 103(a) as unpatentable over Kanari et al. in view of Kinouchi et al. and Hagi et al.; Claims 10, 11, 25, 26, 40, 41, 55, 56, 70 and 71 were rejected under 35 U.S.C. § 103(a) as unpatentable over Kanari et al. in view of Kinouchi et al. and Koh et al.; Claims 14, 29, 44, 59 and 74 were rejected under 35 U.S.C. § 103(a) as unpatentable over Kanari et al. in view of Kinouchi et al. and Okuda; Claims 4, 5, 9, 13, 15, 19, 20, 24, 28, 30, 34, 35, 39, 49, 50, 54, 58, 60, 64, 65, 69, 73 and 75 were indicated as allowable if rewritten in independent form; and Claims 43 and 45 were indicated as allowable if rewritten to overcome the rejections under 35 U.S.C. § 112, second paragraph, set forth in the Office Action and to be rewritten in independent form.

Applicants thank the Examiner for the indication of allowable subject matter.

Regarding the rejection of Claims 43-45 under 35 U.S.C. § 112, second paragraph, these claims have been amended in light of the comments noted in the outstanding Office

Action and as shown in the marked-up copy. Accordingly, it is respectfully requested this rejection be withdrawn.

In the previous amendment filed January 29, 2003, independent Claim 1 was amended to recite that the heater controller controls an amount of heat produced by the heater in accordance with the image information on the recording sheet. Independent Claims 16, 31, 46 and 61 were similarly amended. Arguments were also presented with respect to Figure 6, for example, which illustrates how the heater controller controls an amount of heat produced by the heater in accordance with the image information.

Regarding this feature, the outstanding Office Action applies newly cited Kinouchi et al. as disclosing a fixing device that applies a proper quantity of heat to a toner image at the time of fixing by using an operation processor 44a for setting a proper fixing temperature based on the image information.

Applicants note independent Claim 1 now recites that the unfixed toner image has different size toner images formed with toner and that the heater controller changes an amount of heat produced by the heater in accordance with at least one of a size and a thickness of the different sized toner images on the recording sheet. Independent Claims 16, 31, 46 and 61 include similar features.

In a non-limiting example, Figures 6 and 7 illustrates a recording sheet with an unfixed toner image having different sized toner images (T1-T5). Further, Figure 6 illustrates how the heater controller changes an amount of heat produced by the heater in accordance with at least one of a size and a thickness of the different sized toner images on the recording sheet. That is, as shown in Figure 6, a lower amount of heat is produced for the smaller sized toner image T1 than the larger size T5, etc. As shown by the Aint pulses in Figures 6 and 7, the heater controller changes an amount of heat based on a size of the different sized toner image T1-T5.

On the contrary, Kinouchi et al. disclose an image-processing part 44 for extracting density information of one cycle corresponding to the nip part of the fixing device from the image data, and an operation processor 44a for setting a proper fixing temperature based on the image information . Thus, in Kinouchi et al., the amount of heat selected is based on the overall toner image and is not changed based on different sized toner images as the present invention. That is, Kinouchi et al. does not change the amount of heat applied for different portions of the sheet, but selects one temperature for the entire sheet based on the image information. The additional references cited in the outstanding Office Action also do not teach or suggest the newly claimed features.

Accordingly, it is respectfully submitted independent Claims 1, 16, 31, 46 and 61 and each of the claims depending therefrom are also allowable.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Gregory J. Maier
Attorney of Record
Registration No. 25,599
David A. Bilodeau
Registration No. 42,325



22850

DAB/rac
Tel.: (703) 413-3000
Fax: (703) 413-2220

I:\ATTY\DAB\212847US-AM.doc

| |
|---|
| <p>Marked-Up Copy Serial No: 09/933,153 Amendment Filed on: 06/06/03</p> |
|---|

IN THE CLAIMS

--1. (Twice Amended) A fixing apparatus, comprising:

a heater having a line shape orthogonal to a direction in which a recording sheet carrying an unfixed toner image having different sized toner images formed with toner in accordance with image information is transferred;

an endless belt configured to be rotated with an inner surface thereof sliding over a surface of said heater;

a pressure roller arranged at a position opposite to said heater relative to said endless belt, said pressure roller being held for rotation in contact with said endless belt under pressure to form a nip therebetween; and

a heater controller configured to [control] change an amount of heat produced by said heater in accordance with [said image information] at least one of a size and a thickness of the different sized toner images on the recording sheet,

wherein, when said recording sheet is brought to said nip with said unfixed toner image facing said endless belt, said pressure roller applies pressure to said recording sheet against said endless belt so that said unfixed toner image is fixed on said recording sheet with heat by said heater as said recording sheet is transferred by movement of said endless belt and said pressure roller.

16. (Three Times Amended) A fixing apparatus, comprising:

heating means for heating an unfixed toner image having different sized toner images formed with toner on a recording sheet in accordance with image information, said heating means having a line shape orthogonal to a direction in which said recording sheet is transferred;

endless belt means for being rotated with an inner surface thereof sliding over a surface of said heating means;

pressure roller means being held for rotation in contact with said endless belt means under pressure to form a nip therebetween, said pressure roller means being arranged at a position opposite to said heating means relative to said endless belt means; and

heater controlling means for [controlling] changing an amount of heat produced by said heating means in accordance with [said image information] at least one of a size and a thickness of the different sized toner images on the recording sheet,

wherein, when said recording sheet is brought to said nip with said unfixed toner image facing said endless belt means, said pressure roller means applies pressure to said recording sheet against said endless belt means so that said unfixed toner image is fixed on said recording sheet with heat by said heating means as said recording sheet is transferred by movement of said endless belt means and said pressure roller means.

31. (Three Times Amended) A fixing method of image forming, comprising the steps of:

forming a nip between an endless belt and a pressure roller which are held for rotation in contact with each other under pressure;

providing a heater at position inside said endless belt, in contact with said endless belt, and opposite to said pressure roller relative to said endless belt, said heater having a line shape orthogonal to a direction in which a recording sheet having an unfixed toner image

having different sized toner images formed with toner in accordance with image information is transferred;

rotating said endless belt and said pressure roller, said endless belt sliding over a surface of said heater by rotation;

transferring said recording sheet to said nip, said recording sheet being in an orientation in which said toner image faces said endless belt; and

[controlling] changing an amount of heat produced by said heater in accordance with [said image information] at least one of a size and a thickness of the different sized toner images on the recording sheet when said toner image is brought to said heater.

43. (Amended) A fixing method as defined in Claim 31, wherein said [energizing] controlling step stops energizing said heater during a time when a non-image region between two adjacent toner image lines in said recording sheet is brought close to said heater.

44. (Amended) A fixing method as defined in Claim 31, wherein said [energizing] controlling step energizes said heater during a time when a region of said toner image in said recording sheet is brought close to said heater.

45. (Amended) A fixing method as defined in Claim 31, wherein said [energizing] controlling step energizes said heater with an electric power reduced by 5% or more during a time when a non-image region between two adjacent toner image lines in said recording sheet is brought close to said heater.

46. (Twice Amended) An image forming apparatus, comprising:

an image forming mechanism configured to form a toner image having different sized toner images with toner on a recording sheet in accordance with image information;

a heater having a line shape orthogonal to a direction in which said recording sheet carrying an unfixed toner image formed by said image forming mechanism is transferred;

an endless belt configured to be rotated with an inner surface thereof sliding over a surface of said heater;

a pressure roller arranged at a position opposite to said heater relative to said endless belt, said pressure roller being held for rotation in contact with said endless belt under pressure to form a nip therebetween; and

a heater controller configured to [control] change an amount of heat produced by said heater in accordance with [said image information] at least one of a size and a thickness of the different sized toner images on the recording sheet,

wherein, when said recording sheet is brought to said nip with said unfixed toner image facing said endless belt, said pressure roller applies pressure to said recording sheet against said endless belt so that said unfixed toner image is fixed on said recording sheet with heat by said heater as said recording sheet is transferred by movement of said endless belt and said pressure roller.

61. (Three Times Amended) An image forming apparatus, comprising:

image forming means for forming a toner image having different sized toner images with toner on a recording sheet in accordance with image information;

heating means for heating an unfixed toner image formed with toner on a recording sheet in accordance with image information, said heating means having a line shape orthogonal to a direction in which said recording sheet is transferred;

endless belt means for being rotated with an inner surface thereof sliding over a surface of said heating means;

pressure roller means being held for rotation in contact with said endless belt means under pressure to form a nip therebetween, said pressure roller means being arranged at a position opposite to said heating means relative to said endless belt means; and

heater controlling means for [controlling] changing an amount of heat produced by said heating means in accordance with [said image information] at least one of a size and a thickness of the different sized toner images on the recording sheet,

wherein, when said recording sheet is brought to said nip with said unfixed toner image facing said endless belt means, said pressure roller means applies pressure to said recording sheet against said endless belt means so that said unfixed toner image is fixed on said recording sheet with heat by said heating means as said recording sheet is transferred by movement of said endless belt means and said pressure roller means.--